

## WHAT IS CLAIMED IS:

1           1.     A concrete mixing truck for transporting concrete from one  
2 location to another comprising:

3                 a chassis including: a frame, wheels coupled to the frame, a first  
4 power source coupled to the frame, and a first drivetrain coupling the first  
5 power source and the wheels;

6                 a second drivetrain coupled to a second power source; and

7                 a mixing drum coupled to the frame and to the second drivetrain,  
8 the drum comprising:

9                     a wall including an inner surface defining a volume and an  
10 outer surface; and

11                  at least one formation integrally formed as a single unitary  
12 body with at least a portion of the wall and extending from the inner surface of  
13 the wall, the formation including a tapered base region proximate the inner  
14 surface of the wall.

1           2.     The concrete mixing truck of claim 1, wherein the first power  
2 source and the second power source are the same power source.

1           3.     The concrete mixing truck of claim 1, wherein the width of the  
2 tapered base region decreases as the base region extends further from the  
3 inner surface of the wall.

1           4.     The concrete mixing truck of claim 1, wherein the width of the  
2 tapered base region proximate the inner surface of the wall is approximately six  
3 inches.

1           5.     The concrete mixing truck of claim 1, wherein the tapered base  
2 region extends approximately five inches from the inner surface of the wall.

1           6.     The concrete mixing truck of claim 1, wherein the taper of the  
2 base region is radiused.

1        7.     The concrete mixing truck of claim 6, wherein the radius of the  
2 taper is constant.

1        8.     The concrete mixing truck of claim 6, wherein the radius of the  
2 taper is no less than 10 mm.

1        9.     The concrete mixing truck of claim 1, wherein the formation  
2 further comprises an intermediate region and an end region.

1        10.    The concrete mixing truck of claim 9, wherein a support member  
2 is embedded within the end region of the formation.

1        11.    The concrete mixing truck of claim 10, further comprising at least  
2 one spacer embedded within the end region.

1        12.    The concrete mixing truck of claim 11, wherein the at least one  
2 spacer resiliently engages the support member.

1        13.    The concrete mixing truck of claim 1, wherein the inner surface of  
2 the wall includes a seam.

1        14.    The concrete mixing truck of claim 13, further comprising a first  
2 ramp extending from the inner surface of the wall proximate the seam.

1        15.    The concrete mixing truck of claim 1, wherein the formation and  
2 the wall are integrally formed as part of a single unitary body.

1        16.    The concrete mixing truck of claim 1, further comprising a drive  
2 ring coupled to the wall.

1        17.    The concrete mixing truck of claim 1, wherein the wall includes an  
2 opening.

1        18.    The concrete mixing truck of claim 17, wherein the drum includes  
2 a hatch cover releasably coupled to the opening.

1           19. The concrete mixing truck of claim 18, wherein the hatch cover  
2 includes a first panel on a first side of the opening and a second panel on a  
3 second side of the opening, and wherein the first panel is coupled to the  
4 second panel.

1           20. A heavy duty rotary concrete mixing drum for coupling to a  
2 vehicle having a powered drivetrain for rotating the drum, the drum comprising:  
3 a wall including an inner surface defining a volume; and  
4 at least one projection integrally formed as a single unitary body  
5 with the wall and extending from the inner surface of the wall, the projection  
6 including a tapered base region proximate the inner surface of the wall.

1           21. The mixing drum of claim 20, wherein the projection and the wall  
2 are integrally formed as part of a single unitary body.

1           22. The mixing drum of claim 20, wherein the width of the tapered  
2 base region decreases as the base region extends further from the inner  
3 surface of the wall.

1           23. The mixing drum of claim 20, wherein the tapered base region  
2 extends approximately five inches from the inner surface of the wall.

1           24. The mixing drum of claim 20, wherein the width of the tapered  
2 base region proximate the inner surface of the wall is approximately six inches.

1           25. The mixing drum of claim 20, wherein the taper of the base region  
2 is radiused.

1           26. The mixing drum of claim 25, wherein the radius of the taper is  
2 constant.

1           27. The mixing drum of claim 25, wherein the radius of the taper is no  
2 less than 10 mm.

1        28. The mixing drum of claim 20, wherein the projection further  
2 comprises an intermediate region and an end region.

1        29. The mixing drum of claim 28, further comprising a support  
2 member embedded within the end region of the projection.

1        30. The mixing drum of claim 29, wherein the support member is  
2 torsionally flexible.

1        31. The mixing drum of claim 29, further comprising a plurality of  
2 spacers embedded within the end region, each spacer substantially surrounding  
3 the support member.

1        32. The mixing drum of claim 31, wherein each spacer includes an  
2 outside diameter and an inside diameter when the spacer is wrapped around  
3 the support member.

1        33. The mixing drum of claim 32, wherein at least a portion of the  
2 outside diameter of each spacer lies on the surface of the formation.

1        34. The mixing drum of claim 20, wherein the formation extends  
2 around the inner surface of the wall in the form of an archimedian spiral.

1        35. The mixing drum of claim 20, wherein the wall comprises an inner  
2 layer and an outer layer.

1        36. The mixing drum of claim 35, wherein the first layer is an  
2 elastomeric material.

1        37. The mixing drum of claim 36, wherein the outer layer is a fiber  
2 reinforced composite material.

1        38. The mixing drum of claim 37, wherein the formation is integrally-  
2 formed with the inner layer.

1        39. The mixing drum of claim 20, wherein the wall includes a seam.

1        40. The mixing drum of claim 39 further comprising at least one ramp  
2 extending from the inner surface of the drum proximate the seam.

1        41. The mixing drum of claim 20, wherein the wall includes an  
2 opening.

1        42. The mixing drum of claim 41, further comprising a hatch cover  
2 releasably coupled to the opening in the wall.

1        43. The mixing drum of claim 20, further comprising a drive ring  
2 coupled to the wall, the drive ring being configured to couple to the powered  
3 drivetrain of the vehicle.

1        44. The mixing drum of claim 43, wherein the drive ring comprises a  
2 hub configured to be coupled to the powered drivetrain of a vehicle and a  
3 plurality of hollow extensions extending radially outwardly from the periphery  
4 of the drive ring into the wall of the drum.

1        45. A heavy duty rotary concrete mixing drum for coupling to a  
2 vehicle having a powered drivetrain for rotating the drum, the drum comprising:  
3 a wall including an inner layer and an outer layer, the inner layer  
4 including a first section and a second section, at least one of the first section  
5 and the second section extending from an axial end of the drum across an axial  
6 midpoint of the drum, each of the first section and the second section having  
7 an inner surface; and

8 a first projection coupled to the inner layer of the first section and  
9 extending from the inner surface of the first section, the projection including a  
10 tapered base region proximate the inner surface of the first section.

1        46. The mixing drum of claim 45, wherein the tapered base region is  
2 radiused.

1           47. The mixing drum of claim 46, wherein the first projection extends  
2 around the inner surface of the first section in the form of an archimedian  
3 spiral.

1           48. The mixing drum of claim 47, wherein the inner layer is an  
2 elastomeric material.

1           49. The mixing drum of claim 48, wherein the outer layer is a fiber  
2 reinforced composite material.

1           50. The mixing drum of claim 45, wherein the first projection and the  
2 first section are integrally-formed as part of a single unitary body.

1           51. The mixing drum of claim 45, wherein a seam is formed between  
2 the first section and the second section.

1           52. The mixing drum of claim 51, wherein the first section includes a  
2 ramp extending from the inner surface of the first section proximate the seam.

1           53. The mixing drum of claim 52, wherein the second section includes  
2 a ramp extending from the inner surface of the section proximate the seam.

1           54. The mixing drum of claim 52, further comprising a second  
2 projection coupled to the second section.

1           55. A spiraling formation for use within a heavy duty, rotary concrete  
2 mixing drum capable of attachment to a vehicle, the formation comprising a  
3 body configured to extend inwardly from an inner wall of the drum, the body  
4 having a base portion and a free end, the base portion including at least one  
5 tapered surface, the formation being of a length configured to spirally extend  
6 from an axial end of the drum across an axial midpoint of the drum.

1           56. The formation of claim 55, wherein the body is formed from at  
2 least one polymeric material.

1           57. The formation of claim 55, wherein the greatest width of the  
2 tapered base portion is approximately six inches.

1           58. The formation of claim 57, wherein the greatest height of the  
2 tapered base portion has a maximum height of approximately five inches.

1           59. The formation of claim 55, wherein the width of the tapered base  
2 region decreases as the base region extends further from the inner surface of  
3 the wall.

1           60. The formation of claim 55, wherein the at least one tapered  
2 surface of the base portion is radiused.

1           61. The formation of claim 60, wherein the radius of the at least one  
2 tapered surface is constant.

1           62. The formation of claim 60, wherein the radius of the taper is no  
2 less than 10 mm.

1           63. The formation of claim 55, wherein the formation further  
2 comprises an intermediate region and an end region.

1           64. The formation of claim 63, wherein a support member is  
2 embedded within the end region of the formation.

1           65. The formation of claim 64, further comprising at least one spacer  
2 embedded within the end region.

1           66. The formation of claim 65, wherein the at least one spacer  
2 resiliently engages the support member.

3           67. The formation of claim 56, wherein the body has a midportion  
4 between the base portion and the free end formed entirely from one or more  
5 layers formed substantially from at least one non-metallic material.